Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

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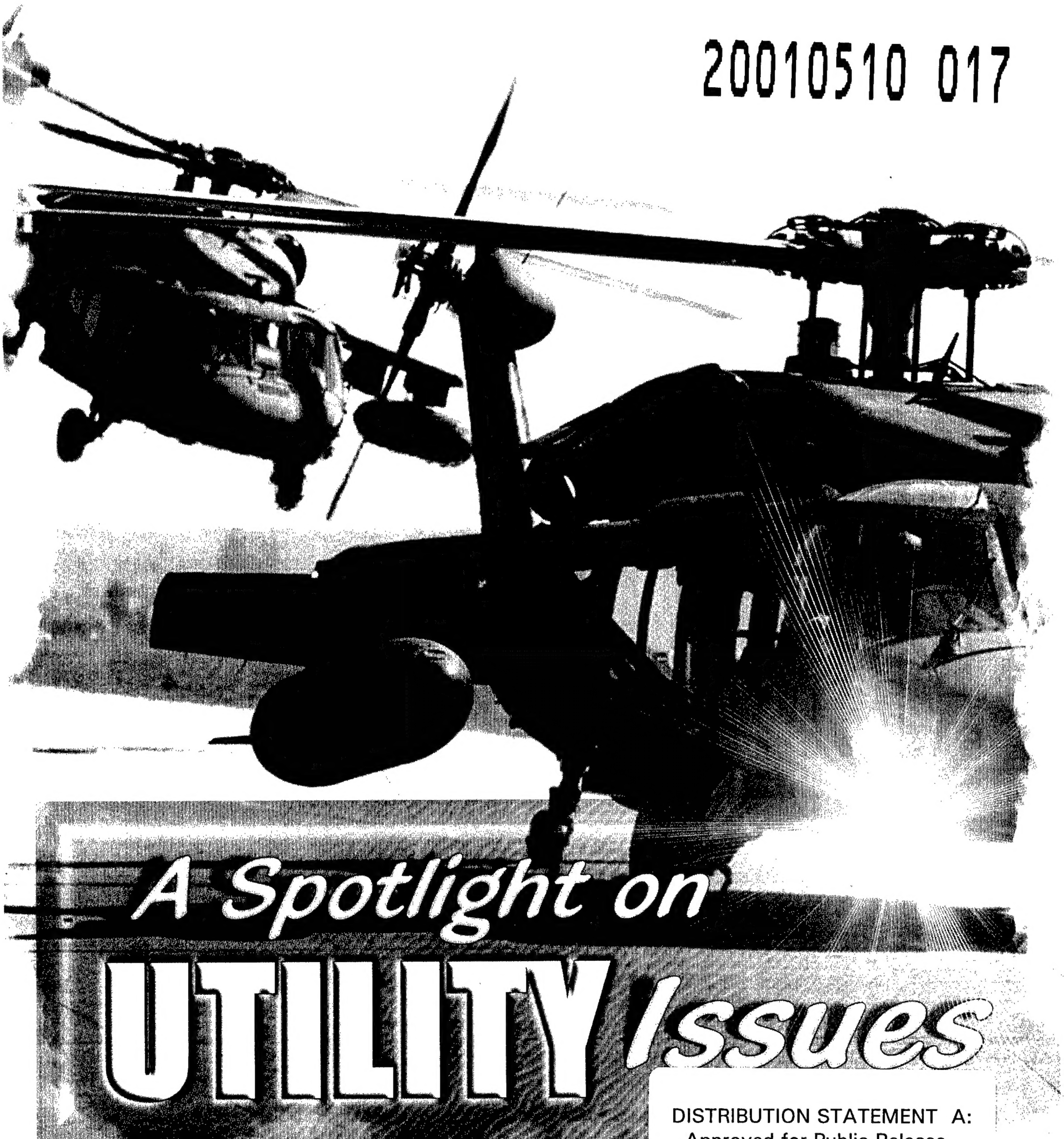


About this issue:

In accident after accident the investigators of the Army Safety Center see the same mistakes over and over again: aircrews and other soldiers either not knowing or not adhering to established standards. There are shortcomings and recommendations in 90 percent of the accident investigations that cite regulations, Aircrew Training Manuals, Technical Manuals, and SOPs not being adhered to. This issue of *FLIGHTFAX* is intended to address these issues but in a somewhat different way.

In a cooperative effort with the U.S. Army Aviation Center Directorate of Evaluation and Standardization (DES), this Utility Helicopter Update is intended not only to review accidents from the Safety Center database and to continue the discussion of the five-step risk management process, but also to take advantage of the trends seen by DES as they travel the world evaluating unit training programs. In this issue you will find some of these trends and some inventive ways for unit leaders and standardization officers to approach them. You will also find new approaches to training, points of contact in the utility helicopter arena, and snapshots of resources available to help units in the field.

Many thanks to the members of the Utility Branch of DES for their input to this issue. Look for similar issues for other aircraft in the future.

—LTC W.R. McInnis, Director of Operations US Army Safety Center

MESSAGE FROM THE UH-60 BRANCH of DES

We would like to congratulate those men and women in the Black Hawk units worldwide, who day after day perform their duties selflessly and professionally. As we crisscross the world conducting unit Aircrew Training Program (ATP) evaluations, we have encountered some truly outstanding units and individuals in both the active duty and reserve component. Because of our wide exposure to such a variety of Black Hawk units, we have been able to identify some trends that seem to be common throughout the Black Hawk community. Some of these trends develop

because of a misunderstanding of written guidance, poorly written or omitted guidance or sometimes just an oversight by the unit's commander and/or standardization personnel.

In this issue of *Flightfax*, we address some of the more prevalent trends and offer solutions and standardized clarification for corrections. Additionally we would like to expose you to some new approaches to training, and some sources of information to aid in implementing your ATP. Please keep up the good work and positive attitude toward standardization. Serving the Best.

—CW5 Rodney L. Sangsland, Chief, Utility Division, Directorate of Evaluation and Standardization, Fort Rucker AL. DSN 558-2442, (334) 255-2442, sangslandr@rucker.army.mil

Standardization Issues

UH-60 POWER MANAGEMENT AND PERFORMANCE PLANNING

Power management has been a hot topic in the safety and standardization arena during the last few years. This is primarily because power management failures have directly contributed to the cause of several recent UH-60 accidents. All factors must be considered when properly managing power (as we read in the *Flightfax* issue of September 99) and none should be regarded as less important than any other. However, during the analysis of these failures, one factor—the lack of performance planning knowledge—has consistently been present.

THE PROBLEM

We have found many reasons for the failure to fully understand performance planning. Based on worldwide DES unit evaluations; we offer the following reasons:

Minimal task iteration requirements: In the TC 1-212, the description section of the TASK 1004, *Prepare a performance planning card,* may tend to imply that regular use of the DA Form 5701-R, UH-60/AH-64 Performance Planning Card is not necessary.

Inadequate performance planning information: When properly filled out, the PPC does not provide the pilot with all the performance planning data required for flight. For example, the actual gross weight of the aircraft and the minimum single-engine airspeeds for the departure and arrival conditions are missing.

No dynamic update in flight: As the performance requirements change during the mission, there is no established method to perform quick and accurate power management updates in flight.

Exceeding angle of bank limitations: Black Hawk pilots often disregard, or are not aware of, the aircraft bank limits based on ambient conditions and/or torque available.

Power available assumption: Black Hawk pilots often disregard narrow power margins, incorrectly assuming there will always be sufficient power available.

Failure to perform a timely jettison: There is nothing more sad than a UH-60 crashing with low rotor RPM and full external fuel tanks.

Command emphasis: Many unit commanders and standardization personnel do not require proper pilot correlation of the PPC to their actual mission (a pencil drill).

THE SOLUTION

DES, in conjunction with the Aviation Training Brigade (ATB) and Directorate of Training, Doctrine and Simulation (DOTDS) has developed a revised PPC that addresses all these problems. This PPC will be included in the publication of the new UH-60 Aircrew Training Manual (TC 1-237). Due to the urgency of improving power management, DES has requested that an interim change to the current TC 1-212 be implemented which includes the revised UH-60 PPC.

Until the interim change is published, the Utility Division of DES recommends the following power management guidance be implemented now at the unit level:

1. Increase individual PPC task iterations across the board and ensure follow-up. Additionally, require pilots to complete the entire PPC when planned takeoff gross weight is within 3000, pounds of maximum allowable gross weight for: a) OGE hover for departure and/or arrival conditions, b) planned cruise conditions.

2. Ensure pilots verify the aircraft takeoff gross weight through accurate weight and balance calculations, or hover check and update the aircraft gross weight in flight as fuel is expended. Pilots cannot know their performance requirements for proper power management unless they can determine at any given time the actual aircraft weight.

Ensure pilots determine minimum single-engine airspeeds for takeoff and landing with and without external stores/loads.

3. Ensure pilots reference Fig 5-9 of the UH-60 operator's manual to determine recommended maximum aircraft bank angles for their planned cruise conditions. Additionally, ensure pilots correlate the relationship between the increased torque requirements and the selected angle of bank as the aircraft rolls into and maintains a coordinated turn.

4. Ensure pilots know how to update their PPC in flight as conditions change during the mission. The tabular data in the back of the UH-60 checklist is the preferred method to easily and accurately update the aircraft performance and power requirements in flight. Ensure your pilots have a thorough understanding of tabular data usage.

5. Ensure that pilots know how to adjust their takeoff and landing techniques when power margins are narrow (high aircraft gross weight and/or high density altitude). Takeoffs should be accelerated through ETL prior to climb out and landings performed with a constant approach angle, low rate of descent and slow airspeeds slightly above transverse flow. Pilots must ***always*** *consider the effects of the wind and plan their takeoffs and landings accordingly regardless of aircraft weight.*

6. Ensure the pilots are trained to know how, and have the confidence to, jettison external stores/loads when conditions require.

7. Unit commanders and instructor pilots must ensure that their pilots not only correctly fill out the DA Form 5701-R, but also accurately apply the data to every aspect of the flight. Ensure correlation of the PPC during readiness level (RL) progression, no notice evaluations, and APART evaluations.

AMCOM has authorized the use of an electronic PPC for the UH-60L, which is Windows 95, 98 and NT compatible. The program and airworthiness release (AWR) may be downloaded from the Aeromed website. The URL is included on page 16 of this *Flightfax*.

PPC is clearly a key factor in properly managing power. I cannot overemphasize the importance of proper performance planning.

—CW5 Rodney L. Sangsland, Chief, Utility Division, Directorate of Evaluation and Standardization, Fort Rucker AL. DSN 558-2442, (334) 255-2442, sangslandr@rucker.army.mil

Standardization issues

SPATIAL DISORIENTATION SCENARIOS

Spatial disorientation (SD) remains an significant cause of accidents in military flying. Field Manual No 3-04.301, *Aeromedical Training for Flight Personnel*, states that, "SD contributes more to aircraft accidents than any other physiological problem in flight." Regardless of their flight time or experience, all aircrew members are subject to SD. In 1997, the U.S. Army Aeromedical Research Laboratory (USAARL) developed spatial disorientation awareness scenarios for visual flight simulators. The scenarios re-created the conditions and events under which actual SD accidents occurred. Although the scenarios are performed to provide a greater awareness of spatial disorientation, the opportunity to impart other lessons is available. These include the maintenance of Visual Flight Rules (VFR) or Instrument Flight Rules (IFR), the difference between VFR and Visual Meteorological Conditions (VMC), the difference between IFR and Instrument Meteorological Conditions (IMC), aircrew coordination, decision making, problem solving, judgment, and overall situational awareness. The scenarios are available as USAARL Report 98-17. Contact USAARL for copies: Bldg. 6901, Fort Rucker, AL 36351, DSN 558-6936, http://www.usaarl.army.mil.

Standardization Issues

TRAINING SUPPORT PACKETS (TSP)

Ensure that in qualifications requiring a TSP, that the current TSP is used. Below is a list of current TSPs available from DOTDS, USAAVNC that are required by the UH-60 ATP:

- ✓ TSP-Air Volcano
- ✓ TSP-ERFS with AFMS
- ✓ TSP-Aircrew Coordination Training qualification
- ✓ TSP-AN/ASN 128B Sustainment
- ✓ TSP-UH-60 NCM Familiarization
- ✓ TSP-EH-60A Aircraft and Mission Qualification

To request a TSP, call CW4 Mark Duerst, ATM Branch, Directorate of Training, Doctrine and Simulation, DSN 558-9660/9661, (334) 255-9660/9661 or log on to FTP://155.147.190.23

Emergency procedures

ECU/DECU Lockout Procedures for the UH-60

The DES Utility Division has noticed a trend among UH-60 aviators involving task no.1062, Perform Electronic Control Unit (ECU)/Digital Electronic Control Unit (DECU) Lockout Procedures. A common practice while performing this task is to retard the Engine Power Control Lever (PCL) to the 6 o'clock position immediately after placing the engine in lockout. However, placing the PCL at the 6 o'clock position removes torque being supplied to the main rotor by the malfunctioning engine and could cause the Rotor RPM (RPM R) to droop further. This technique could lead to some disastrous consequences if the power from the engine in lockout is required to maintain flight.

DEFINITIONS

First, let's review what the ECU/DECU provides to the Hydro Mechanical Unit (HMU). When everything is operating normally, the ECU/DECU provides an electrical input to the HMU to accomplish three tasks. 1) Control Turbine Gas Temperature (TGT) not to exceed the limiter value. 2) Maintain the Np reference, usually at 100%. 3) Match the other engine torque, if it is higher than its own torque. When an engine is placed in lockout, these functions of the ECU/DECU are removed from that engine and engine power is set directly by the PCL. This power is set based on a fixed collective position. Increasing or decreasing the collective will increase or decrease engine power on the lockout engine because the HMU load demand inputs are still functioning. The normal engine will still try to load share with the lockout engine, so once the power to maintain RPM R is set, the lockout engine torque can be set 10% below the normal engine to reduce pilot workload of constantly adjusting the PCL due to collective changes.

Now, let's look at the definitions of ECU/DECU lockout and some situations where retarding the PCL too far during lockout would not be the right choice. Keep in mind that this article is referring to using ECU/DECU lockout *only* for the reasons described in chapter 9 of the UH-60 operators manual, i.e., DECREASING % RPM R due to a malfunctioning ECU/DECU or % RPM INCREASING/DECREASING (OSCILLATION). The following information is not designed as an emergency procedure for decreasing RPM

R when there is insufficient dual engine power. Accurate performance planning and dinamic updates must be used to prevent entering this condition. If you don't have the power, you don't do the maneuver!

The UH-60 operators manual defines lockout as "manual control of engine RPM while bypassing ECU, or DECU functions. Bypass of the engine control will be required when % RPM 1 or 2 decreases below normal demand speed."

Remember, one of the ECU/DECU's primary functions is to maintain RPM R at a constant 100%, or whatever reference is set. RPM R equals survivability in the UH-60. Again, without the ECU/DECU providing this function, we, the pilots, now become the controller's function of RPM R

The underlined procedure in the UH-60 operators manual for performing lockout reads *"ENG POWER CONT lever – Pull down and advance full forward while maintaining downward pressure, then adjust to set % RPM R as required."*

Nowhere in this description does it say to retard the PCL to the 6 o'clock position. It **does** say to adjust to set RPM R as required. The proper response may be to hold the PCL forward of the fly detent until RPM R recovers, then adjust as necessary. This may mean allowing the RPM 1 or 2 and RPM R to transient into the 101-107 range before retarding. This decision will be based on how critical the situation is.

The technique of retarding the PCL to the 6 o'clock position may be a byproduct of the CAUTION associated with ECU/DECU lockout, which states that engine response is much faster and TGT limiting system is inoperative. DES is not advocating that crewmembers ignore their limitations, but in certain situations it is better to risk a possible engine "overtemp" and get the aircraft and crew down safely. Maintaining RPM R is the key to making sure this happens. In these situations, the engine owes you nothing more than to get the crew and the aircraft down safely.

The TC 1-212 reference for ECU/DECU procedures is found on page 6-55. The procedure says to "Immediately retard the engine power control lever to some intermediate position between IDLE and FLY to manually control the engine." Based on the urgency of the situation, following this procedure could cause the RPM R to further decrease if the PCL is retarded too far.

Situations

Situation #1: During level flight at 500' AGL the crew notices a decrease in RPM R due to a malfunctioning ECU/DECU. If the dual engine torque reading is above ½ the maximum torque available, lowering the collective will probably bring the RPM R back into the continuous operating limits. The crew now has time to determine when and if the engine will need to be placed into lockout. The urgency of the situation is not at a critical stage, and time is available to perform lockout. If the aircraft is within the single-engine airspeed flight envelope, placing the ECU/DECU in lockout and immediately retarding the PCL should have no adverse affect on the aircraft. Limitations will not be exceeded and a suitable area to land as soon as practicable can be found. This is a situation where the training of retarding the PCL immediately to the 6 o'clock position will not become a factor.

Situation #2: In a heavily loaded aircraft during the landing approach into a small LZ, the crew notices a decrease in RPM R due to a malfunctioning ECU/DECU. The collective cannot be lowered enough in this case to return RPM R into the continuous range. The crewmember identifies the proper PCL and places it into lockout, holding the PCL forward until engagement of lockout is confirmed by an increase in power (torque, TGT, Np), keeping it forward of the fly detent until RPM R returns within limits. The PCL can then be smoothly retarded until torques are approximately matched. Then adust PCL at least 10% below the other engine torque. The initial rearward movement of the PCL should be accomplished quickly enough to avoid exceeding transient limits, yet maintain RPM R at or near 100%.

As an UH-60 aviator, how well do you really know your

aircraft systems? As a trainer in the UH-60, how are you teaching your aviators to perform maneuvers? Confidence and proficiency in lockout operations comes with practice. This procedure should be trained and practiced in the simulator throughout the entire flight spectrum from approach to Vh. Training in the UH-60 must be realistic, and the guidelines of the ATM and manual are the standards we will follow. DES is not advocating going outside the training guidelines, disregarding standards or exceeding limitations. Solid knowledge of systems, situational awareness and prioritizing actions play a very important part in surviving a critical situation. Would you rather replace an engine or a flight crew?

—CW3 Steven W. Woodfint, SP, UH-60 branch, Directorate of Evaluation and Standardization, Fort Rucker AL, DSB 558-1748, (334) 255-1748, woodfints@rucker.army.mil

Emergency Procedure Issues

UH-60 EMERGENCY PROCEDURE TRAINING: A NEW PHILOSOPHY

Over the lifetime of the Black Hawk, the method by which crewmembers were trained to perform certain emergency procedures has failed to properly prepare the crew to perform in critical situations. According to the results of worldwide evaluations and accident investigations, aircrew members have not performed according to their oral knowledge in critical situations. These same crew failures of the past haunt the Black Hawk community today, despite the introduction of aircrew coordination training and changes to emergency procedures.

Our new training philosophy seeks to fundamentally change the way emergency procedures are trained and evaluated. With the current UH-60 Operator's Manual we can incorporate the crew coordination elements into emergency procedure training. The intent is to improve how emergency procedures are trained and evaluated now, while the procedures evolve over time. This brings us to our first tenet:

ROTE MEMORIZATION IS FOR THE TABLE.

A pilot should not be required to recite all underlined steps of an emergency procedure while in flight and at a set of controls. This disrupts crew coordination and the proper performance of the procedure. It is imperative that we train and evaluate these actions separately. Rote memorization is required in an academic setting while application (performance and proper crew coordination) is required in the aircraft. When performing emergency procedures in the aircraft, each pilot should announce his actions and perform them as required by his duty position. This point brings up the next tenet:

EACH PROCEDURE HAS TWO PARTS.

The pilot on the controls (P*) performs the first part and The pilot not on the controls (P) performs the second part.

Each underlined step of the emergency procedure

designates which pilot must perform the step depending on which pilot is on the controls. Pilots must show proficiency in each role. Training that incorporates both of these roles will enhance aircrew coordination. A standardized crew can then use the immediate action steps as a call-out checklist as each pilot performs the steps required by his duty position. An example of a well-coordinated crew proficient in the performance of a particular emergency would be similar to this:

P*: "I have a pedal drive; I am opposing the drive."
P: "Trim switch is off."
P*: "The pedal is still driving."
P: "Boost switch is off."
P*: "The pedal is still driving."
P: " Boost switch is on; I'm inside with the checklist."

The immediate action steps in current checklists are not scripted for easy announcement of actions. However, using scripts similar to this will allow the trainee to perform in each role while announcing his actions in the proper sequence. A proficient pilot will be able to understand and perform the emergency procedures using proper crew coordination. We also must consider those emergencies where the steps are not in order. For instance, during an engine fire, would the pilot on the controls wait for the last step to start his approach for landing? We hope not, but that is what we have seen during evaluations. It is the responsibility of standards personnel to develop the scenarios necessary for proper practice.

The most important consideration is aircraft control.

The pilot on the flight controls will fly the aircraft.

This is emphasized as one of the most fundamental aspects of the crew briefing, as it should be. This new philosophy requires that pilots perform specific actions in the event of an emergency while they are on the controls, rather than just verbalizing these actions. The instructor must teach in detail what specific actions must be performed. This sounds simple, but during evaluations many inexperienced pilots cannot state how they would fly the aircraft, specifically, what they would do with the flight controls. For example, let's start training pilots in one simple maneuver: establish single-engine airspeed. The pilot in command should select an emergency single-engine airspeed based on power available and brief that emergency single-engine airspeed to the crew. Don't always assume this will be a deceleration. Use normal flight attitudes (no extreme maneuvers to establish this airspeed). No matter what the emergency, establishing a single-engine airspeed will give the crew the best chance for a successful recovery.

The next step is establishing an approach to a suitable landing area. Look for a place to land. It falls to the pilot on the controls to find the best spot to land, but the rest of the crew can assist him. The emphasis here is to be prepared to make the approach with a normal rate of descent to the ground. The pilot on the controls only has a few things to do: control the rotor, control the aircraft, establish single-engine airspeed, and set up for approach and landing. These actions should be briefed prior to each flight and should be initiated and completed whenever an emergency is detected. The instructor pilot should allow simulated emergencies to continue to a successful landing whenever possible.

Some emergencies are more critical than others.

We are not saying that some emergencies are more important; we are saying that there are some emergencies that are more time-critical when it comes to performing the immediate action steps. Most emergencies can be dealt with in a deliberate manner, but some emergencies require true immediate actions. We strongly recommend that the initial immediate action of these particular emergencies be briefed prior to each flight. We have purposely kept this list to a minimum, and suggest that if others are added, they be scrutinized carefully to ensure that they are truly critical emergencies. They are:

- SINGLE-ENGINE FAILURE
- DUAL-ENGINE FAILURE
- DECREASING % RPM R

■ LOSS OF TAIL ROTOR THRUST
■ ENGINE FIRE IN FLIGHT
■ UNCOMMANDED NOSE DOWN PITCH ATTITUDE CHANGE

MOST REAL EMERGENCIES HAPPEN OUTSIDE THE TRAFFIC PATTERN.
This is really where an IP begins to earn his money. The IP must train emergency procedures in realistic tactical settings. There are no regulatory restrictions to this. When local SOPs restrict this type of training, commanders should revise them. We must develop scenarios that replicate the real emergency as closely as aircraft limits and safety allow. It is not necessary to announce, "simulated" prior to the pilot reacting to the emergency. The pilot on the controls must learn to recognize that something has changed in the performance of the aircraft, and relay this information to the pilot not on the controls. This does not mean taking chances or putting the aircraft in unrecoverable situations. However, this does mean that the IP be proficient enough to allow for safe training in realistic situations.

Once adopted, units will find that this training philosophy will foster smooth, efficient and safe emergency procedures performance in the cockpit.

—CW4 Steven Mulcahy, SP, UH-60 Branch, Directorate of Evaluation and Standardization, Fort Rucker AL. DSN 558-2442, (334) 255-2442, mulcahys@rucker.army.mil

Accident briefs

Information based on *preliminary* reports of aircraft accidents

AH64

Class C

A series

■ During hover taxi while aircraft was repositioning for take off, gun barrel made contact with the ground. Aircraft was kept at a hover and maintenance personnel removed barrel assembly. Aircraft landed without further incident. Damage to gun barrel and carriage assembly.

Class E

A series

■ During Post Phase Test Flight, Test Pilot was performing power check on the No.1 engine. The No.2 power lever was at idle, while aircraft was cruising at 130KIAS at 4500 MSL. BUCS Fail Light illuminated. Pilot returned the No 2 power lever to fly and landed as soon as possible. Aircraft was landed with no damage, all systems were brought back on line. Maintenance personnel could not duplicate; aircraft was released for flight.

■ During RL progression, the master caution light illuminated with corresponding illumination of the VIB GRBX segment light. When segment light did not extinguish after 10 seconds, crew landed as soon as possible to an open field in the training area and maintenance was notified. The signal data processor had failed. Maintenance replaced the SDP. No damage to the aircraft was found. Aircraft was released for flight.

CH47

Class B

D series

■ Rear rotor blade contacted the fuselage on engine shutdown. Damage to fuselage.

Class C

D series

■ During post phase maintenance test flight, copilot's jettisonable door departed the aircraft over water and was not recovered. Aircraft was landed without further incident.

OH58

Class A

D-I series

■ During overwater flight, aircraft crew experienced severe vibration and the decision was made to ditch into the sea. Observer reported seeing a piece of the aircraft separate prior to the ditching. Two crewmembers sustained hypothermia injuries. Aircraft lost at sea.

■ During acceptance flight while conducting an autorotational RPM check, aircraft landed hard and off the runway. Damage to airframe, skids, 4 main rotor blades, tail rotor assembly with tailboom separation. Aircraft destroyed.

Class C

C series

■ During IERW basic combat skills training, while demonstrating a low-level auto, the instructor pilot (IP) felt a vibration in the aircraft as the short landing slide stopped. The IP repositioned the aircraft to the grass next to the landing lane and exited the aircraft to ensure there was no damage. The IP discovered damage to the tailboom and shut down the aircraft. The post-flight inspection confirmed that the K-FLEX drive shaft had made contact with the isolation mount cover.

DR series

■ Aircraft made a turn into a tailwind condition and began to spin. Engine and mast experienced overtorque while arresting spin condition, Engine 135 percent, Mast 128 percent.

■ Aircraft landed hard during autorotation maneuver. Engine experienced power droop during application of collective during recovery. Damage occurred to aircraft's landing gear.

Class E

C series

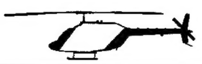
■ While hovering to parking, engine oil bypass segment and master caution lights illuminated with all other instruments indicating normal. Aircraft was landed and shutdown without

further incident. Postflight inspection revealed oil on left side of engine. Maintenance inspection revealed upper scupper packing had failed. Maintenance replaced packing and aircraft was released for flight.

DI series

■ Aircraft took off from airfield and pilot noticed stiffness in controls. Aircrew remained in the traffic pattern and discovered binding/resistance in left rear quadrant of cyclic. Aircraft landed at airfield and taxied to parking. Aircraft was shutdown without further incident. Maintenance notified. Hydraulic servo was replaced. Aircraft was released for flight.

TH67



Class B

■ During hover, aircraft made contact with the ground. Tail boom separated, damage to main rotor blades, right skid, loss of windshield.

UH60

Class A

L series

■ While conducting a night, NVG terrain flight multi-ship air assault, a flight of four aircraft were executing a right-hand turn to final from a staggered right formation, when two aircraft collided in mid-air. Six fatalities. Two aircraft destroyed.

Class C

A series

■ While entering landing zone, Chalk 3 of 3 encountered whiteout conditions. All four main rotor blades struck a tree. Replacement of rotor blades required.

Class D

A series

■ After a Night Vision Goggle training flight, which included terrain flight decelerations and landings to a sod area on the airfield, damage was found to the trailing edge of the stabilator during the post flight inspection. During one of the training iterations, the instructor pilot had recovered the aircraft from excessive pitch attitude and rate of descent. There was no indication of any malfunction with the stabilator, and training was continued.

Class E

A series

■ During engine start, crew noticed smoke/exhaust in the cabin area. Engine was shutdown and smoke/exhaust ceased. Inspection of engine compartment revealed V-band clamp loose allowing improper direction of exhaust gases. Improper torque was apparently applied to V-band clamp nut. Additionally, the nylon engine cowling stop block had melted from heat. V-Band clamp nut and stop block were replaced. Aircraft released for flight.

C12

Class E

P series

■ On climb out when aircraft began pressurizing, pilot's airspeed indicator began decreasing erroneously. Pilot switched to alternate pitot static source and returned to base without further incident. Maintenance inspected aircraft and found pilot's static system drain was not properly seated. Aircraft was given a MOC and released for flight.

C23

Class E

■ During takeoff right engine failed. Aircraft returned to field and landed without further incident.

For more information on selected accident briefs, call DSN 558-9855 (334-255-9855). Note: Information published in this section is based on preliminary mishap reports submitted by units and is subject to change.

Do Your Crew Chiefs Know?

In the UH-60 community, crew chiefs have always played a critical role. Bad pilots view them as little more than passengers. Good pilots have always recognized their importance and encouraged all members of their crew to actively participate in the flight.

While assigned to the 82nd and during a 1992 JRTC rotation, I was amazed to learn how valuable another aircraft's crew chief could be to me.

The mission was to be a "typical" ten-ship assault of Airborne Infantry troops into the box, nothing any one of us had not done before. AH-64s, OH-58Ds and Cs, UH-60s from the CAV and a flight of ten UH-60s from my unit would all be in and around the box at the same time. The challenges of multiple aircraft attempting synchronized movement were many. Recognizing the dangers, the routes and AOs were de-conflicted by time, terrain or altitude.

Flying co-pilot in the lead Black Hawk was exciting. At the FSB, I was pumped to see all those Black Hawks armed with 60s, ready to go. It had become normal practice for our unit to fly with external tanks installed, as on this mission.

The take off was routine and the route easily identifiable at the beginning of the 30-minute flight to the PZ. Thankfully, the radios were quiet. So far, things were going by the book.

The box was getting closer. The crew chiefs armed the 60s and prepared to look for threats. Even though the area was to be somewhat safe, the nature of JRTC Low Intensity Conflicts made every flight in the box full of threats. The crew chiefs did their best to maintain airspace surveillance, but remember, the M-60's range is primarily forward and down. This, we later learned, made the crew chiefs tend to channel their attention that way. To complicate matters, crew chiefs have almost no visibility directly out the sides, and viewing to the rear is challenging to say the least.

As we entered the box, we came to about 80 feet AHO. The terrain relief was minimal, making navigation more difficult than it had been. Sitting in the right seat, I scanned as well as I could in all directions, knowing that the PIC was busy managing timing and navigation. We had studied the route well, and knew that on entering the box our route went between several areas full of aircraft. As usual, commanders were getting antsy as we got farther into the mission, and the time for pick-up got closer. The radios exploded. As the lead aircraft, we did not have the luxury to turn any radios off and needed to plainly hear any call that came for us. Communication among our crew dropped off a bit. The only quiet net was our flight internal net. Have-Quick, VHF and one FM were blaring.

Suddenly, we heard over flight internal net, a frantic voice calling "CLIMB! CLIMB! CLIMB!" I sat up a little straighter, but assumed, just like the rest of our crew, that an aircraft behind us was about to strike a tree. "CLIMB! CLIMB! CLIMB!" This time I recognized the voice; it was the PIC of Chalk Four. Again, I looked around a little more, but saw no danger.

On flight internal, we now heard a very calm, but forceful call starting with our call sign. "__________ ONE ONE, CLIMB NOW!"

That's all I needed! I pulled the collective up sharply and felt the PIC assisting. We shot from 80 feet AHO to about 300. As we began climbing I heard the PIC yell. All of this took place in a matter of seconds.

Once we leveled out, I looked around. The only thing I could see was an OH-58D below us to the right, heading off to our two o'clock. Strangely, I had not noticed him earlier. The AMC told us to descend and slow down so the flight could reform.

That's the first indication we had that the flight had split up. The rest of the flight had seen the 58 approaching our aircraft, almost perpendicular to our flight path from the left, from about our eight. Expecting the worst as it got closer, other crews had departed the flight so as not to join the impending mid-air. When one PIC had tried to warn us, we interpreted his frantic call as HIS emergency. When we climbed, the 58 continued on its way to our right front, towards our two.

My PIC seemed shaken as we landed at PZ and asked the AMC for a delay. He told me he needed a second to collect himself. He was the one who had yelled out at the same time he saw the 58. He later told me if he had stuck his leg out the door, he could have kicked the ball off the mast!

The life saving radio call had come from chalk three. Realizing that the call was not being correctly received, the crew chief on the left side off that aircraft made the all-important radio call that saved 6 lives and two aircraft.

At the completion of the mission, we could not determine if anyone was where he was not supposed to be. We believed ourselves to be at the right place at the right time along the route. We could not find a 58 crew who could say they had been around or saw the assault flight. The only thing we knew for sure, as the other nine crews confirmed, was that the crew chief of chalk three had saved the day. He knew his equipment. He knew radio procedures. He quickly sized up the situation and took action. If not an actual hero, he sure was mine.

UH-60 Pilots, ask yourself how you view your crew. **All** of your crew. Let them know that you understand the essential function they perform. If they are not encouraged to participate and keep a level of situational awareness as high as yours, you may not reap the benefits that two aircraft and crews did in the box.

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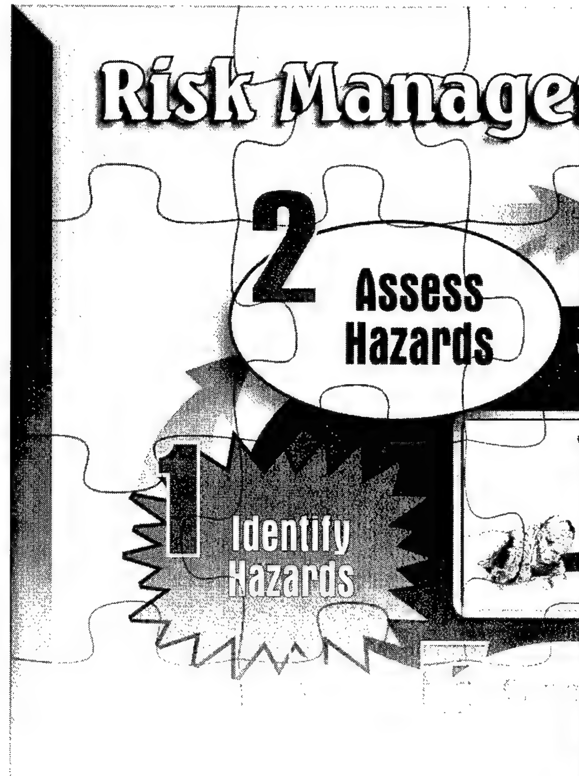
Looking Beyond Identifying and Assessing Hazards

This article, the third in a series on the risk management process, focuses on Step 3: "Developing controls and making risk decisions."



When Safety Center personnel conduct accident investigations, they look for the root causes of the accident. One that often stands out is that leaders are not fully applying the 5-step risk management process. The commanders and NCOs of accident units can usually show that they penciled a worksheet. They identified likely hazards. They assigned at least a personal impression of the degree of risk. Then the process broke down. The leaders didn't really carry out Step 3, developing controls and making risk decisions at the appropriate level. Thus, there was no countermeasure to execute, nothing to follow-up.

Too often, risk-reduction controls are never developed, and when they are, they are not adequate or are not implemented. Without that central risk-management step, the first two steps are almost useless and the last two are not properly targeted!

Actually, there are two related phases to this step. Leaders must obviously develop hazard controls before they can make any decisions about them, so I'm concentrating on that aspect in this article. Next month, we'll discuss the second part of Step 3 *"Making risk decisions."*

Control development hasn't changed since people started thinking about safety in an organized method—most controls can fit into three methods.

■ **Engineering.**

Leaders can engineer-out some hazards. Engineering is the most positive and proactive way to control hazards. When the soldiers' equipment, environment, or tasks are permanently changed to remove the hazard, troops can operate more freely without losses.

Ideally engineering begins before the drawing board—when the acquisition folks first design requirements and materiel solutions. In the real world, engineering continues long after equipment is fielded.

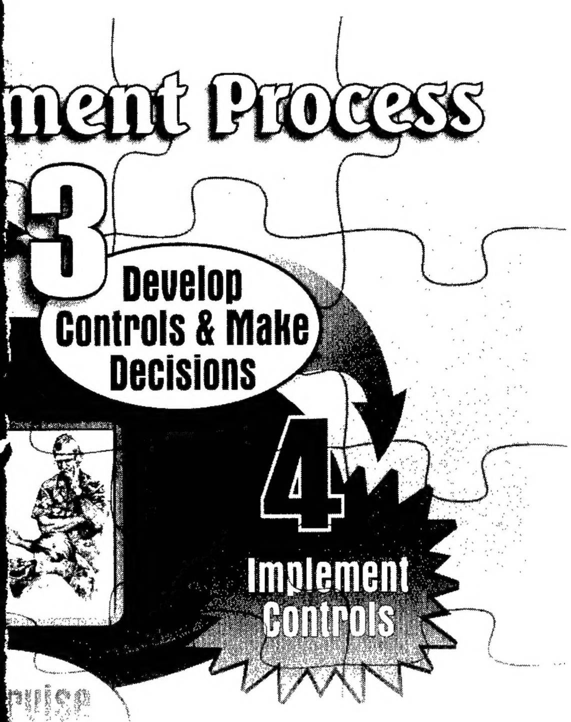
Engineering doesn't end when good equipment gets in the soldier's hands. The state of maintenance and facility upkeep is constantly monitored through the command inspection and work order effort. The Armywide equivalent is the Modification Work Order (MWO). Even MWOs ultimately rely on user-unit leaders to make sure their equipment gets the right priority and doesn't fall through the cracks.

Reengineering a mission doesn't mean abandoning it. Reengineering means finding and maximizing every available advantage—time, equipment, illumination, rest, troop talent, support—all the METT-T factors and more.

■ **Training.**

Soldiers can be trained to safely operate around hazards. When hazards can be physically eliminated, they should be. But, much of the time, the Army operates in situations where engineered controls aren't feasible. This means that when the environment can't be fixed, or the fix is slow in coming, commanders fall back on training.

Soldiers who trigger human-error accidents sometimes don't know how to perform the operation safely.



Those soldiers are candidates for more training. If a soldier knows his job, but he chooses to take shortcuts, that's a different problem and requires a different solution (see Enforcement below).

Training is best used to teach soldiers how to operate around risk that can't be further reduced without compromising the mission. Instead, unit commanders sometimes are forced to use training to compensate for hazards inherited from a flawed system or facility. For example, training to improve driving behavior is a good control for the high-risk traffic environment. It's a bad control for a lousy vehicle suspension or defective tires and brakes.

■ **Enforcement.** Leaders must enforce safe standards of unit performance and individual discipline. Just as there are missions and environments that are not safe for any soldier, we get accident reports on soldiers who would not be safe in any environment, no matter how well-engineered. Erratic behavior can make any mission a high-risk mission. The most extreme cases are rare, but all units will experience human-error accidents if soldiers are not given effective standards and held to them. If standards aren't enforced, there are no standards.

The standards themselves must be appropriate to the operation. They must be current, they must be suitable, and they must be understood. Standards are not risk controls when they are out-of-date, or when they call for unavailable resources (such as equipment and the time to use it). Standards are not controls when they're in a book back at the head-shed. Army regulations, technical manuals, and SOPs become *real* standards when leaders communicate them to their soldiers in a way that consistently produces the desired performance. And that's not always easy, and it's never a one-shot effort.

We've looked at soldiers who don't know or don't understand the standard for safe performance—they are uninformed. Sometimes they don't trust the standard—they are unconvinced. Sometimes they know and understand the rules, but choose another course of action—those soldiers are undisciplined. Effective leaders make soldiers internalize the rules for safe behavior, and act to the standard. They consistently acknowledge and reward soldiers who are doing the right thing the right way, not those who gamble for short-term results by "making it up as they go along."

Internalized discipline, which becomes habitual self-discipline, is essential for on-duty performance to standard. It's even more important off-duty, away from a controlled situation and leadership oversight. Most Army fatalities are caused by off-duty accidents, primarily in POVs. It's the attitudes learned in the unit that protect young soldiers out on the highways.

The unit commander can't re-engineer the car or the highway, however he can have some influence on the timing and conditions of his soldier's trip. Constantly building self-discipline is the way commanders and NCOs reach into the cab of the soldier's pickup.

In planning real-world missions, risk managers will mix and match these control methods. However, none of the methods will have any impact on fatal accidents unless the risk management cycle is completed. The developed controls must be executed and monitored. Somebody has to do it!

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NCO CORNER –Non-Rated Crewmembers

NCM vs. NRCM?

Currently the acronyms NCM and NRCM are being used incorrectly—some clarification is needed. AR 95-1, AR 600-106, TC 1-212, TC 1-211 and TC 1-210 all recognize NCM as the official acronym for Non-Rated crewmember. TC 1-210 is the only publication that addresses NRCM. NRCM is an acronym that also represents Non-rated crewmembers. In future publications (TC 1-200, the new commander's guide and TC 1-237, the new UH-60 ATM) the NCM acronym will be the only authorized acronym for Non-rated crewmembers.

INDIVIDUAL AIRCREW TRAINING FOLDERS (IATF)

IATFs inspected during recent visits reveal that many mandatory entries per TC 1-210, paragraph 3-18 (pages 3-40 through 3-42) are not being documented. Entries such as evaluations, Aircrew Coordination Training (ACT) qualification, start of RL progression, and significant training events are not being properly annotated on DA Form 7122. Completion of ACT academics and ACT academics/evaluation flights must be annotated on DA Form 7122 per TC 1-210, paragraph 1-9b(2). All evaluations will be annotated on DA Form 7122 (i.e. Commander's evaluation, annual NBC evaluation, Aerial gunnery, No-notice evaluations, etc.). The start and completion date of aircraft or NVG qualification must be annotated. The start date should correspond with the date the individual was designated RL 3. Other entries include all significant training. Examples of significant training include, but are not limited to: local area orientation, Non Rated Crew Member Flight Instructor (FI)/Non Rated Crew Member Standardization Flight Instructor (SI) training, M60D training, and any qualification academics (i.e. ERFS, ACT, or NVG). Local area orientation is required per TC 1-210, paragraph 3-5, prior to the NCM progressing to RL 1. FIs and SIs will be trained per AR 95-1; paragraph 4-33 and all significant training will be documented on DA Form 7122.

In reference to DA Form 7120-1/-2, Task 2079 (Perform terrain flight mission planning) does not apply to NCMs. An error in TC 1-212, figure 5-3, incorrectly states that Task 2079 applies to NCMs. *Task 2079 is not required for NCMs.*

TRAINING

We are finding that training for NCMs is not beening annotated IAW TC 1-210 or conducted IAW TC 1-212. All training required per AR 95-1, TC 1-210 and TC 1-212 must be annotated in the IATF. Inspections have discovered that units were unaware of the requirement for NCMs to undergo mandatory qualification academics per TC 1-212, paragraph 2-1b and figure 2-1. They must also complete written exams per paragraph 2-1b and Figure 2-1. During initial flight qualification, NCMs must receive at least one hour of night unaided flight prior to progressing to RL 2 day/night. During NVG progression the NCM must have a start date of NVG qualification/RL training. This date is needed to determine the start of the 90 days required for RL progression. The NVG academics as outlined in the USAAVNC NVG ETP, must also be annotated on the 7122 upon completion.

These dates will allow for FIs and SIs to follow and track NVG progression and ensure that the 60-day sliding window is not exceeded per TC 1-210, paragraph 4-4a. NCMs must complete one hour of NVG training in a static aircraft. This training is to include emergency engine shutdown, egress (i.e. evacuation of a pilot), NVG failure, and aircraft switch locations. This hour may be applied towards the 5.5 NVG flight hour minimum for NVG qualification in the aircraft and must be annotated on DA Form 7122.

EVALUATIONS

NCM evaluations had not been conducted IAW TC 1-212, chapter 8. FIs and SIs must ensure they perform all evaluations using chapter 8 and following the four phases in order. When conducting evaluations, FIs and SIs must ensure they evaluate to the standard, *and not conduct training*. This seems like a simple task, but too often FIs and SIs turn the evaluation into training. Then they annotate the results as if an evaluation had been completed. An example: during an NCMs standardization evaluation, the NCM failed to perform TASK 1065, Perform emergency egress, to standard. The NCM failed to turn off the fuel boost pumps during emergency engine shutdown. The FI or SI decided not to give the NCM a "U" for that task and trained the individual instead. This brings up two problems. First, the FI or SI did not enforce and/or grade to the established standards in the ATM. Second, by giving the NCM credit for a task not performed to standard, the FI or SI consequently has lowered the standard. The next time that NCM is evaluated he/she may feel that there is no need to maintain individual proficiency. The soldier may be tempted to say, "The last time I had an APART evaluation Joe SI showed me how to do the task...so he will probably show me this time too...so I do not need to prepare or study".

The standards need to be enforced IAW the ATM. FIs and SIs need to set and enforce the standards. This is non-negotiable.

The commander's evaluation, as per TC 1-210, paragraph 2-4, is used to determine the initial readiness level of crewmembers. The evaluation consists of a records review and possibly a Performance Flight Evaluation. The shortcoming we have noticed is that the commander's evaluation is not being annotated on DA Form 7122 or is not properly conducted. The record(s) review includes the IATF and the IFRF. During the review the commander or his representive must investigate for the NCM's last day/night flight, NVD flight, ACT qualification date, ACFT qualification date, current/local DA Form 4186, RFO or placement on flight status, and any other special mission qualifications (i.e. EFRS qualification, SPIES qualification, rescue hoist qualification, etc.). On completion of the commander's evaluation, the results of the records review should be annotated in the Remarks section of DA form 7122.

NON-CREWMEMBERS

Non-crewmembers as defined in AR 600-106, will not be integrated into the ATP, except those authorized to perform non-rated crew member duties. They do not need IATFs or APARTS. RL progression does not apply to non-crewmembers. The commander, however, may utilize non-crewmembers to perform NCM duties if they meet the following requirements:

- Must be MOS qualified to perform duties as mentioned above. For example, platoon sergeants and technical inspectors are both 67Ts.
- May perform NCM duties only when the assigned NCM is on an authorized absence (leave, TDY, etc.)
- Must be fully integrated into the ATP to include IATFs, APARTS, RL progression and all training and evaluations that normally apply to NCMs (i.e. ACT Qualification, NBC evaluations, etc.).

Shops personnel (avionics or engine technicians) are not authorized to be integrated into the ATP. Non-crewmembers will receive a passenger briefing from a crewmember prior to each flight to ensure they are aware of ALSE, emergency egress, emergency procedures and any other pertinent information required for that flight.

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Useful Utility Websites

- Directorate of Evaluation and Standardization (DES)
  http://www-rucker.army.mil/des/des.htm
- AMCOM Aviation Safety Messages
  http://www.redstone.army.mil/sof
- Directorate of Training, Operations and Simulation (DOTDS)
  http://155.147.98.10/dotds/dotds.htm
- Electronic Technical Manuals Online
  http://www.logsa.army.mil/etms/online.htm
- Utility Helicopter Project Manager's Office
  http://www.uhpo.redstone.army.mil
- United States Army Aeronautical Services Agency (USAASA)
  http://www.usaasa.belvoir.army.mil
- UH-60L Electronic Performance Planning Card
  http://www.aeromech.redstone.army.mil

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